

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
19 May 2005 (19.05.2005)

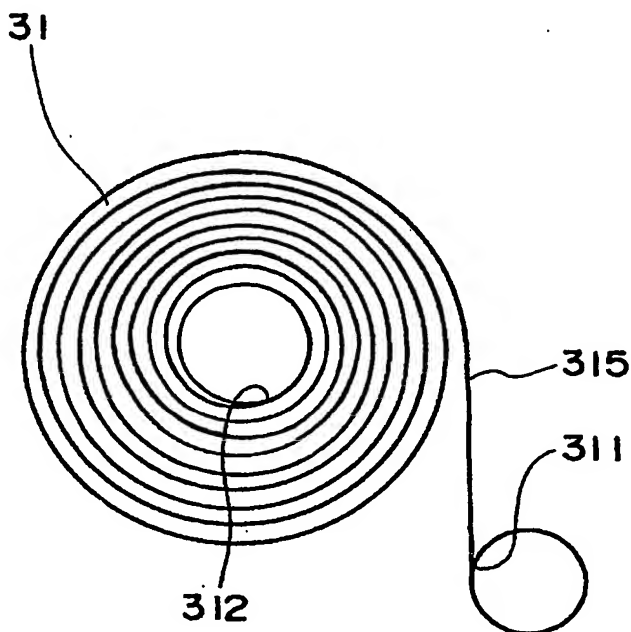
PCT

(10) International Publication Number
WO 2005/045532 A2

- (51) International Patent Classification⁷: **G04B 1/14**
- (21) International Application Number:
PCT/JP2004/016499
- (22) International Filing Date:
1 November 2004 (01.11.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
2003-378449 7 November 2003 (07.11.2003) JP
- (71) Applicant (for all designated States except US): **SEIKO EPSON CORPORATION** [JP/JP]; 4-1, Nishi-Shinjuku 2-chome, Shinjuku-Ku, Tokyo 163-0811 (JP).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **HARA, Tatsuo** [JP/JP]; c/o Seiko Epson Corporation, 3-5, Owa 3-chome, Suwa-Shi, Nagano 392-8502 (JP). **MIYATA, Kazuma** [JP/JP]; c/o Seiko Epson Corporation, 3-5, Owa 3-chome, Suwa-Shi, Nagano 392-8502 (JP).
- (74) Agents: **KAMIYANAGI, Masataka** et al.; c/o Intellectual Property Division, Seiko Epson Corporation, 3-5, Owa 3-Chome, Suwa-Shi, Nagano 392-8502 (JP).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— without international search report and to be republished upon receipt of that report

[Continued on next page]

(54) Title: TIMEPIECE AND SPRING THEREOF



(57) Abstract: [Object] To provide a timepiece spring whereby it is possible to ensure high precision and stable operation of precision mechanisms such as timepieces, and to provide a timepiece spring, a mainspring, a hairspring, and a timepiece wherein long-term operation can be ensured when the spring is used as a power source.[Means] A mainspring used as a source to power a drive source is formed from a special titanium alloy and has an S shape when freely spread out, wherein the inflection point at which the curving direction of the freely spread-out shape changes is formed farther inward than the midpoint of an inner end at the end of the winding side and an outer end at the end opposite the inner end. The titanium alloy constituting the present invention has high tensile stress and a low average Young's modulus, making it possible to increase the mechanical energy accumulated in the mainspring 31.



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.